



**MAILBOX ACCESS MECHANISM OVER LOW-BANDWIDTH, HIGH-LATENCY
WIRELESS NETWORKS**

FIELD OF THE INVENTION:

5 The present invention relates to messaging systems for wireless devices. More particularly, the present invention relates to an access mechanism for retrieving messages over low data-bandwidth, high data-latency wireless networks.

BACKGROUND OF THE INVENTION:

10 It is becoming increasingly desirable for an individual to gain remote access to her or his voice, fax or electronic mail messages. Additionally, with the increasing number of cellular phone users, the ability to access voice, fax or electronic mail messages by way of cellular phone is becoming more prevalent, creating the need for improving upon the traditional method of accessing messaging systems remotely.

15 To access their messages, cellular phone users would traditionally place a regular voice call into the messaging system, listen to automated voice prompts and enter dual-tone multi-frequency (DTMF) commands on their phone keypad. This process forces the user to go through each message serially, letting the system dictate the sequence in which the messages are presented. With this traditional approach, there is no efficient solution for letting users jump
20 directly to a specific message in the mailbox.

Other approaches have been attempted, leveraging wireless phone visual displays and data transaction capabilities. For example, by using the Wireless Application Protocol (WAP), so-called "Internet" phones can display the content of the mailbox, let the user select a particular message and instruct the messaging system to play the chosen message.

This Internet phone mailbox access mechanism utilizes a classic client/server or command/response paradigm as illustrated in Figure 1. Existing embodiments of this application, such as prototypes by Lucent Technologies and Comverse Network Systems, utilize a WAP-enabled cellular phone as the “client” and the messaging system as the “server”.

5 In Step One 14 of such a prototype, the user must first initiate a connection from the Client 12 by issuing a command to authenticate the user and connect to the Server 10. After verifying and accepting credentials, the Server 10 then connects to the Client 12 as illustrated in Figure 1 by Step Two 15. The time needed to complete Step One 14 and Step Two 15 can vary anywhere from a few to several seconds depending on a number of network conditions. For
10 instance, several network elements such as routers, switches and gateways to the PSTN or the Internet may be involved in the connection, introducing long connect times and network latency. Furthermore, the relative low data bandwidth of currently deployed wireless networks restricts the amount of data that can be exchanged between the client and the server within a short time period.

15 In Step Three 16, the Client 12 issues a command to the Server 10 instructing the Server 10 to list the contents of the mailbox. In Step Four 17, the Server 10 returns the content list to the Client 12. This step again can typically take anywhere from two to ten seconds. In Step Five 18, the user can scroll through the list of messages and issue a command to listen to a particular message and in Step Six 19, the Server 10 plays the selected message.

20 All the delays associated with this access mechanism become generally unacceptable to even the most patient of users, making it much faster and convenient to retrieve messages using the conventional method of placing a call to a voice mail system. Because of long connect times, high latency and relative low bandwidth, it is not possible to implement a client/server approach that provides an adequate user experience similar to what one might expect on a standard web
25 browser connected to the Internet.

SUMMARY OF THE INVENTION:

The present invention is a push model access mechanism which can provide visual access to a voice, a fax or an e-mail (unified) mailbox through a wireless network with low data bandwidth and high data latency.

5 The push model utilizes a wireless messaging bearer such as Short Message Service (SMS) to send the updated mailbox content list as a notification message. A data-capable wireless device such as a WAP phone receives the new message notification and stores the updated mailbox content list from the messaging server.

10 The wireless device is configured to allow the user to scroll through the updated mailbox content list. This step can be performed without accessing the wireless network. Lastly, the user issues a command to the server using the wireless device prompting the server to send a specific message back to the wireless device to be played or viewed by the user.

BRIEF DESCRIPTION OF THE DRAWINGS:

15 Figure 1 illustrates a block diagram of the prior art.

 Figure 2 illustrates a block diagram of the preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

20 The preferred embodiment of the present invention is illustrated in Figure 2. Like traditional access mechanisms, this embodiment utilizes both a Wireless Device 24 and a messaging Server 20 linked through a Wireless Network 30. However, in the preferred embodiment of the present invention, the Wireless Device 24 and the Server 20 interact more efficiently, thus providing the user with an optimal method of accessing voice, fax or e-mail messages.

According to the preferred embodiment of the present invention, the Wireless Device 24 is a WAP-enabled phone. Alternative embodiments of the present invention can utilize other devices such as, but not limited to, a personal digital assistant, a personal computer or a laptop. Various devices can be implemented in alternative embodiments and the Wireless Device 24 as described above is only illustrative of the preferred embodiment of the invention and is in no way a limitation.

Also in the preferred embodiment of the present invention, the Wireless Network 30 is a digital wireless voice network with Short Message Services (SMS) capabilities. Various wireless networks can be implemented in alternative embodiments and the Wireless Network 30 as described above is only illustrative of the preferred embodiment of the invention and is in no way a limitation.

The Server 20 of the preferred embodiment of the present invention can be a server of the type utilized in voice, fax, e-mail or unified mailbox systems operating according to the process. Various types of servers can be utilized in alternative embodiments and the Server 20 as described above is only illustrative of the preferred embodiment of the invention and is in no way a limitation.

In Step One 22 of the preferred embodiment, the Server 20 sends or “pushes” a new message notification and an updated mailbox content list to the Wireless Device 24 via SMS. The data comprising the new message notification and the updated mailbox content list is sent as data information. Accordingly in the preferred embodiment, the Wireless Device 24 includes data display technology. One example of such a Wireless Device 24 is a WAP-enabled cellular telephone. The new message notification and updated mailbox content list is preferably stored in the Wireless Device 24. The Wireless Device 24 can be configured to alert the user such as with a display notice, beep or tone, or a vibration. Thus, the user can view this list almost instantly. Further, because the data is stored in the Wireless Device 24, the user can interact with the

mailbox content locally within the Wireless Device 24 without establishing a Wireless Network
30 connection to the Server 20. Commands such as "Call back sender", "Call in mailbox to
listen to message x", "Delete message y" or "Save message z" can then be implemented using
the most efficient Wireless Network 30 interaction possible such as a traditional telephony
5 network call or a data network interaction.

After the user views the updated content list with the Wireless Device 24, Step Two 26 of
the preferred embodiment of the present invention is a command by the user using the Wireless
Device 24 to the Server 20 instructing the Server 20 to play a particular message. Playing the
message may involve conversion of textual information into an audible form by using of a text-
10 to-speech engine. Upon receiving the command from the Wireless Device 24, the Server 20
executes Step Three 28. In Step Three 28, the Server 20 sends the requested message to the
Wireless Device 24 where the user may then either view a previously selected fax or e-mail
message or listen to a previously selected voice message using just the Wireless Device 24.

Also in the preferred embodiment of the present invention, the content list is continually
15 updated and sent by the Server 20 to the Wireless Device 24 every time a new message is
received in the user's network mailbox. Additionally, the content list is updated after the user
has accessed the mailbox by other traditional means, such as a telephone call.

The advantages of the preferred embodiment of the present invention compared to the
traditional client/server paradigm are numerous. First, the preferred embodiment enables a much
20 more responsive and faster interaction with the user because digital data is automatically
transferred to a user's Wireless Device 24 without requiring the user to place a telephone call
into or establish a data network session with the messaging server. This provides a much
enhanced user experience. For instance, a traditional client/server approach could involve
several minutes to retrieve new messages as compared to the almost instant retrieval time for the
25 present invention. Also, the preferred embodiment reduces the complexity of implementation

and support requirements for Internet/data connectivity to the messaging server and provides greater reliability and more scalability by reducing traffic and bandwidth requirements.

Additionally, the preferred embodiment of the present invention can be implemented using current technology and/or emerging standards and lowers the cost of developing the application while increasing its value to the end user. Lastly, by “pushing” the information rather than “pulling”, it will be easier to pass information through corporate firewalls and hence make the preferred embodiment viable to a much broader market base. For example, the push model can be a viable application option for customer premised-based messaging systems sitting behind a corporate Internet firewall.

The present invention has been described in terms of specific embodiments incorporating details to facilitate the understanding of the principles of construction and operation of the invention. Such reference herein to specific embodiments and details thereof is not intended to limit the scope of the claims appended hereto. It will be apparent to those skilled in the art that modifications may be made in the embodiment chosen for illustration without departing from the spirit and scope of the invention. Specifically, it will be apparent to one of ordinary skill in the art that the device of the present invention could be implemented in several different ways and the apparatus disclosed above is only illustrative of the preferred embodiment of the invention and is in no way a limitation.